IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants:	Schottland, et al.	)	
		)	Group Art Unit: 1714
Serial No.:	10/619,643	)	
		)	
Filed:	July 15, 2003	)	Examiner: Vickey M. Ronesi
		)	
For:	COLORED POLYMERIC RESIN COMPOSITION, ARTICLE MADE THEREFROM, AND METHOD FOR MAKING THE SAME	)	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is General Electric Company.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellants, Appellants' legal representatives, or assignee that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-37 are pending in the application. Claims 1-36 stand finally rejected. Claim 37 has been allowed. Claims 1-36, as they currently stand, are set forth in the Claims Appendix. Appellants hereby appeal the final rejection of Claims 1-36.

IV. STATUS OF THE AMENDMENTS

An amendment has been filed on March 23, 2006 subsequent to the final rejection dated January 30, 2006. This amendment as well as all prior amendments has been entered.

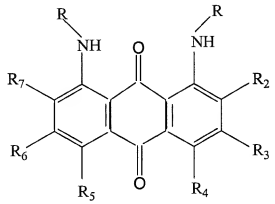
V. SUMMARY OF CLAIMED SUBJECT MATTER

Colored polymeric resin articles are utilized in all areas of commerce ranging from automotive and aerospace products. (Paragraph [0001]). Colors enhance the aesthetics, salability and often the useful life of an article, and can help distinguish brands. (Paragraph [0001]).

Some colorants, however, can adversely affect the ability to cure through the polymeric resin and thus have had limited commercial use in such applications. (Paragraph [0002]). Moreover, desirable colorants for coloring polymeric resins need to be compatible with the resins, heat stable enough to sustain the heat involved in the processing (e.g., extrusion, molding, thermoforming) of such resins, and/or yield transparent compositions allowing the desired curing in the UV region (at or around about 365nm). (Paragraphs [0002] and [0040]).

In independent Claim 1, a colored polymeric resin composition comprises a polymeric resin, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone,

polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least one of the foregoing polymeric resins; and a 1,8-diaminoanthraquinone derivative having a purity of greater than or equal to about 90 wt% and having a Formula (VIII):



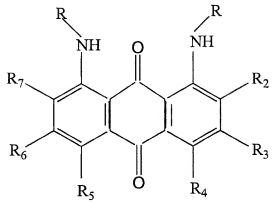
(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, $NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring.

Dependent Claim 27 further defines the polymeric resin in Claim 1 to be a polycarbonate resin having a weight average molecular weight of about 20,000 and dependent Claim 31 is directed to an article formed from the composition of Claim 27.

In independent Claim 24, a colored polymeric resin composition comprises a polymeric resin, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone, polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl

acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least one of the foregoing polymeric resins; and a 1,8-diaminoanthraquinone derivative having a Formula (VIII):

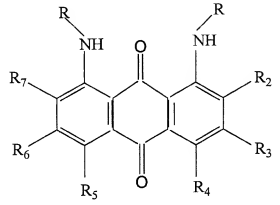


(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, --$NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring; wherein an article formed from the composition has a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm).

In independent Claim 32, a method of making a colored polymeric article comprises forming a composition of a polymeric resin and a 1,8-diaminoanthraquinone derivative, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone, polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least

one of the foregoing polymeric resins, and wherein the 1,8-diaminoanthraquinone derivative has a purity of greater than or equal to about 90 wt%, and has a Formula (VIII):



(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, --$NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring; wherein the 1,8-anthraquinone derivative gives a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm); and forming the composition into the article.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-6, 8-25, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 3,853,807 to Hunter (hereinafter "Hunter") in view of U.S. Patent No. 3,923,454 to Genta (hereinafter "Genta").

Claims 1-26, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 5,882,358 to Smith et al. (hereinafter "Smith") in view of the combined teachings of U.S. Patent No. 4,735,631 to Orelup (hereinafter "Orelup") and Genta.

Claims 1-13, 16-26, 28-30, and 32-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over GB 985,970 to Turner et al. (hereinafter "Turner") in view of the combined teachings of U.S. Patent No. 4,655,970 to Priester et al. (hereinafter "Priester") and Genta.

Claims 27 and 31 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over either Smith in view of the combined teachings of Orelup and Genta or Turner in view of the combined teachings of Priester and Genta, either of which and further in view of U.S. Patent No. 5,747,632 to Adachi et al. (hereinafter "Adachi").

VII. ARGUMENT

Claims 1-6, 8-25, 28-30, and 32-36 are Non-Obvious over Hunter in view of Genta.

Claims 1-6, 8-23, and 28-29

Appellants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness for at least the reason that at least one claimed element is not taught or suggested by Hunter either alone or in combination with Genta. Additionally, Hunter and Genta do not provide any suggestion or motivation to combine or modify their teachings.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; and that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Appellants respectfully submit that independent Claim 1 is directed to a colored polymeric resin composition having the required components of a particular 1,8-diaminoanthraquinone derivative according to Formula VIII having a purity of greater than or equal to about 90 wt%; and a polymeric resin as outlined in the claim. The Applicants have found that the purity of the 1,8-diaminoanthraquinone derivative is important both for obtaining the appropriate light absorption characteristics for efficient UV curing (Specification at paragraph [0012]) and for heat stability when used in thermoplastics, which are typically processed at high temperatures (Specification at paragraphs [0040] and [0066]). By minimizing

impurities (e.g., 1,5-anthraquinone impurities, Specification at paragraph [0038]) present in the 1,8-diaminoanthraquinone derivative, the Applicants have discovered that the 1,8-diaminoanthraquinone derivative is more stable at high processing temperatures (see Specification at paragraph [0040]). As can be seen in Example 9 of the Specification, a comparison of 1,8-bis(cyclohexylamino)anthraquinone having 99% purity, designated Composition A, is more stable in processed polycarbonate than the corresponding 1,5-bis(cyclohexylamino)anthraquinone, designated composition B, Solvent red 207 (Example 9, Table 7 and paragraph [0066]). Reducing the less stable 1,5-anthraquinone impurities in the 1,8-bis(cyclohexylamino)anthraquinone derivative results in a more stable colorant.

Furthermore, the presence of 1,5-anthraquinone impurities in a 1,8-diaminoanthraquinone derivative colorant affects the light absorption characteristics of the colorant such that the when the amount of 1,5-anthraquinone impurities increases, the extinction coefficient at 550 nm and above decreases whereas the extinction coefficient at about 500 nm increases (see Specification at paragraph [0040]).

In contrast, both Hunter and Genta are completely silent as to any teaching or suggestion of the particular purity of the 1,8-diaminoanthraquinone derivative as required by Claim 1. Indeed, neither reference even discusses the purity of a diaminoanthraquinone derivative in any way. Hunter generally discloses certain azabenzanthrone and diazabenzanthrone dyes that have been found to be resistant to spontaneous high temperature degradation, and to be useful as colorants for photographic film products made by extruding a dyed polyester film base. The few 1,8-diaminoanthraquinones disclosed in Hunter are mentioned to illustrate how poor they are for use in molten poly(ethylene terephthalate) as they spontaneously degrade. (Hunter Column 6, line 51 to Column 8, line 1). Hunter is silent as to the purity of the few 1,8-diaminoanthraquinones disclosed therein.

Genta generally discloses anthraquinones containing phenylsulfonyl groups suitable for dyeing polyester materials and rigid plastic materials. However, Genta does not disclose the particular 1,8-diaminoanthraquinone derivatives of Claim 1, let alone the particular claimed purity required by the claim. Thus, Hunter and Genta fail to disclose at least one required element of Claim 1.

While not denying that neither Turner nor Genta teaches the required purity of Claim 1, the Examiner nevertheless asserts that "it would have been within the capabilities of one of

ordinary skill in the art to utilize pure, clean material" and that "pure materials are generally accepted as being desirable." (Advisory Action, dated April 11, 2006, page 2). Applicants respectfully maintain that the Examiner has used an improper standard in arriving at the above §103 rejection. The correct standard is whether the cited references contain any teaching or suggestion that would have motivated a skilled artisan to modify a reference or combine references (see *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988)), not whether it would have been within the capabilities of a skilled artisan to utilize a claimed element. In using the "within the capabilities" or "generally accepted as being desirable" standard, the Examiner has improperly considered the teachings of the instant application rather than those of the cited references. It is respectfully suggested that in doing so, the Examiner has impermissibly used the Applicants' own disclosure as a suggestion or motivation to arrive at the Applicants' own invention. Such a hindsight rejection fails to provide a proper prima facie case of obviousness. (Please also see MPEP2143.01 IV).

Additionally, instant Claim 1 is further not obvious over Hunter and Genta as these references do not provide suggestion or motivation to modify or combine them to arrive at the instant claim. Appellants respectfully submit that Hunter does not suggest using 1,8-diaminoanthraquinones to dye the particular polymers of the instant claim as this reference fails to suggest the desirability of such a combination. The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. (See *In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987)). In the context of discussing certain azabenzanthrone and diazabenzanthrone dyes suitable as colorants for polyester film base, Hunter mentioned a few 1,8-diaminoanthraquinone compounds, among many other dyes, merely to illustrate how poor they are for such use because these dyes have been found to spontaneously degrade excessively when they are held in molten poly(ethylene terephthalate) for one hour at a temperature of 280°C at 500 ppm level. (Hunter Column 6, line 51 to Column 8, line 1). The Examiner asserts that "Hunter's disclosure strongly suggests that 1,8-diaminoanthraquinone is used in polymeric resins, just not advantageously in the high temperature processing conditions of polyesters." (Advisor Action, dated April 11, 2006, pages 2-3). Appellants respectfully disagree. Hunter said nothing about whether the few 1,8-diaminoanthraquinones are suitable for dying polymers other than polyesters as that appears to be outside the scope of Hunter. Indeed, a skilled artisan

would think that these dyes would not be suitable for coloring other polymers because polymer coloration often involves high temperature processing and Hunter disclosed these dyes as unstable at high temperatures. Moreover, even assuming, *arguendo*, that Hunter teaches that 1,8-diaminoanthraquinones can be used for non-polyester polymers, it simply does not teach or suggest the desirability of doing so, let alone for dying the particular polymers of the instant claim.

Genta does not cure the lack of suggestion or motivation as Genta is directed to dying rigid plastic materials with anthraquinones containing phenylsulfonyl groups, but fails to teach or suggest the desirability of using other dyes, let alone the 1,8-diaminoanthraquinones as required in Claim 1, to color the particular polymers of the instant claim. Thus, there is no teaching or suggestion to combine Turner and Genta to arrive at the instant claim.

Accordingly, as Hunter and Genta, either alone or in combination, fail to disclose at least one element of independent Claim 1, and, additionally, there is no suggestion or motivation to combine Turner and Genta to arrive at the instant claim, this claim is not obvious over Turner and Genta, and therefore allowable. Moreover, as dependent claims from an allowable independent claim, Claims 2-6, 8-23, and 28-29 are, by definition, also allowable.

Claims 24-25 and 30

Appellants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness for the reasons that at least one claimed element is not taught or suggested by Hunter and Genta, either alone or in combination; and that there is no suggestion or motivation to combine or modify the references.

Specifically, Hunter and Genta, either alone or combined, fail to teach or suggest the particular composition of independent Claim 24. Claim 24 requires a particular combination of a 1,8-diaminoanthraquinone derivative according to Formula (VIII) and a polymeric resin as outlined in the claim so as to provide an article formed therefrom to have a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm). Hunter and Genta are completely silent in regard to the hue angle value requirement for the article.

Additionally, Hunter and Genta do not provide any suggestion or motivation to combine the references to use the anthraquinones of Hunter in the polymeric resins of Genta, as Hunter

teaches away from using these anthraquinones in polyester. Particularly, Hunter discloses that 1,8-biscyclohexyl anthraquinone and other substituted anthraquinones spontaneously degrade excessively in molten poly(ethylene terephthalate) polyester. (Hunter Column 6, line 51 to Column 8, line 1). As such, there would be no motivation to combine a 1,8-diaminoanthraquinone of Hunter with the polymers set out in Genta.

Accordingly, as Hunter and Genta, either alone or in combination, fail to disclose at least one element of independent Claim 24, and, additionally, there is no suggestion or motivation to combine the teachings of Turner and Genta, independent Claim 24 has not been rendered obvious. Therefore Claim 24 and dependent Claims 25 and 30 are allowable.

Claims 32-36

Appellants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness for at least the reason that at least one claimed element is not taught or suggested by Hunter either alone or in combination with Genta; and that there is no suggestion or motivation to combine or modify the references.

Appellants respectfully submit that independent Claim 32 requires the use of a particular 1,8-diaminoanthraquinone derivative (Formula VIII above) having a purity of greater than or equal to about 90 wt% as a dye for coloring a polymeric resin as outlined in the claim. In contrast, both Hunter and Genta are completely silent as to any teaching or suggestion of the particular purity of the 1,8-diaminoanthraquinone derivative as required by Claim 32. As presented above, the Applicants have discovered that a more pure 1,8-diaminoanthraquinone derivative is a more stable colorant, especially desired for use in polymer resins which are typically processed at high temperatures or with extended molding cycles. As described in Example 9 of the Specification, two polycarbonate compositions containing a dye were compared for heat stability. It was found that Composition A of polycarbonate and 1,8-bis(cyclohexylamino)anthraquinone having a 99% purity was more stable to extended molding cycles that a corresponding Composition B of polycarbonate and Solvent red 207 which is 1,5-bis(cyclohexylamino)anthraquinone. None of the references teaches or suggests the required purity of the 1,8-diaminoanthraquinone compounds. Therefore, Claim 32 and its dependent Claims 33-36 are not obvious over the cited references and are thus allowable.

Moreover, Hunter and Genta also fail to teach or suggest the element of the particular hue angle value of the 1,8-diaminoanthraquinone derivative as required by Claim 32. Hunter and Genta are completely silent in regard to the hue angle value requirement for the 1,8-diaminoanthraquinone derivatives.

Furthermore, independent Claim 32 is further not obvious over Hunter and Genta as these references do not provide suggestion or motivation to modify or combine them to arrive at the instant claim. As discussed previously, Hunter does not suggest using 1,8-diaminoanthraquinones to dye the particular polymers of the instant claim as this reference fails to suggest the desirability of such a combination. Hunter mentioned a few 1,8-diaminoanthraquinone compounds, among many other dyes, merely to illustrate how poor they are for such use because these dyes have been found to spontaneously degrade excessively when they are held in molten poly(ethylene terephthalate) for one hour at a temperature of 280°C at 500 ppm level. (Hunter Column 6, line 51 to Column 8, line 1). Indeed, one of skill in the art would not be motivated to use the 1,8-diaminoanthraquinones of Hunter due to Hunter's teaching of instability. Genta does not cure the lack of suggestion or motivation as Genta is directed to dying rigid plastic materials with anthraquinones containing phenylsulfonyl groups, but fails to teach or suggest the desirability of using other dyes, let alone the 1,8-diaminoanthraquinones of Hunter, to color the particular polymers of the instant claim. Thus, there is no teaching or suggestion to combine Turner and Genta to arrive at the instant claim.

Accordingly, Claim 32 and its dependent Claims 33-36 are not obvious over Hunter and Genta and therefore allowable.

Claims 1-26, 28-30, and 32-36 are Non-Obvious over Smith, Orelup, and Genta.

Claims 1-26, 28-30, and 32-36

Appellants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness for at least the reason that there was no suggestion to combine the cited references. In addition, there was no expectation of success of combining the cited references.

The requirement for a determination of obviousness is that "both the suggestion and the expectation of success must be founded in the prior art, not in applicant's disclosure." *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). An Examiner thus cannot base a determination of obviousness on what a skilled person in the art might try or find obvious

to try. Rather, the proper test requires determining what the prior art would have led a skilled person to do, with a reasonable expectation of success. *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988).

Genta fails to teach or suggest the use of the particular 1,8-diaminoanthraquinone derivative required by the instant claims 1, 24, and 32. Smith discloses the use of 1,5-diaminoanthraquininones either alone or in combination with 1,8-diaminoanthraquininones in transmission fluid, but fails to teach or suggest the use of 1,8-diaminoanthraquininones alone, let alone for use in coloring polymeric resins. Orelup discloses the use of 1,4-hydroxyanthraquinones as both dyes and markers in petroleum liquids, but fails to teach or suggest the use of 1,8-diaminoanthraquinones for dying polymeric resins.

Smith, Orelup, and Genta, alone or together, fail to provide any suggestion or motivation to combine these references to arrive at the instant claims 1, 24, and 32 for the following reasons.

First, they are directed to different fields of art. While Genta is directed to polymeric dying, Smith and Orelup are directed to transmission fluid dying or petroleum tagging.

Second, Genta does not teach the use of the particular 1,8-diaminoanthraquinones for dying polymeric resins. Smith teaches that although 1,5-diaminoanthraquinones can be used alone for tagging transmission fluid, 1,8-diaminoanthraquinones is used as an adjunctive dye with 1,5-diaminoanthraquinones, but not alone. Smith does not discuss why 1,8-diaminoanthraquinones cannot be used alone. However, a skilled artisan in polymeric coloring would not be motivated to use an adjunctive dye used for transmission fluid coloration to color polymer resins as neither Genta nor Smith provides any suggestion for such a combination. The Examiner asserts that "it is not understood why an adjunctive dye would not be considered as a dye, just like the primary one". (Advisor Action, dated April 11, 2006, page 3). Appellants respectfully point out that the Examiner's standard is misplaced because the correct inquiry is whether there is any suggestion or motivation to combine the references (see *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988)), not whether it is possible to combine them. Moreover, there can be many reasons why a dye can be used only as an adjunctive dye rather than a primary one. For instance, an adjunctive dye may not have enough dying capacity to be used as a primary one or it may have compatibility issues when used alone. Genta and Smith simply failed to provide any teaching or suggestion to combine the particular 1,8-diaminoanthraquinone with one of the specific set of polymeric resins of the instant claims.

Third, Orelup does not cure the deficiency of Smith and Genta as it teaches neither the use of 1,8-diaminoanthraquinones nor any of the specific set of polymeric resins of the instant claims that can be colored by any anthraquinone dyes. The Examiner alleges that "the fact that dyes of Smith and Genta are used to prepared [*sic*] different products is remedied by Orelup, which provides the nexus and teaches that anthraquinone dyes are used in both tagging materials and polymeric resins." (Advisor Action, dated April 11, 2006, page 3). Appellants respectfully submit that the Examiner appears to have improperly used the "obvious to try" standard rather than the correct "suggestion or motivation" standard. Orelup is directed to petroleum tagging. It mentions in passing that a 1,4-diaminoanthraquinone has been used for dying polyester fibers. However, it fails to teach or disclose any 1,8-diaminoanthraquinone dyes, either for petroleum tagging or polymer dying. Thus, Orelup's general teaching that a 1,4-diaminoanthraquinone has been used for dying polyester fibers fails to cure the deficiency of Genta and Smith as to any suggestion or motivation to combine 1,8-diaminoanthraquinones with the particular polymeric resins of the instant claims.

Additionally, there is also no expectation of success of combining Genta, Smith, and Orelup. For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references, and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996). Smith and Orelup are non-analogous art as they are directed to transmission fluid/petroleum tagging, whereas Genta is directed to coloring certain polymeric resins. Coloring transmission fluid/petroleum liquids and polymers are very different as they involve different processes and conditions. For example, polymeric coloring often involves processing at high temperatures to fully incorporate the dye (see, Specification paragraphs [0002] last sentence, and [0012] third sentence) placing requirements on colorants regarding heat stability and compatibility with polymers. Thus a dye that finds successful use in coloring transmission fluid or other petroleum fluids would not necessarily find success for coloring polymers,

especially the specific set of polymers of the instant claims. Thus Genta, Smith, and Orelup do not provide a reasonable expectation of success for combining them to arrive at the instant claims.

Accordingly, the claims are not obvious over Genta, Smith, and Orelup as these references fail to provide any suggestion or expectation of success to combine them to arrive at the instant Claims 1, 24, and 32 or their dependent claims.

Claims 1-23, 26, 28-29, and 32-36

Appellants respectfully submit that if the Board were to agree with the Examiner that Smith, Orelup, and Genta do provide both suggestion and expectation of success to combine 1,8-diaminoanthraquinones with one of the specific set of polymeric resins of the instant claims, Claims 1-23, 26, 28-29, and 32-36 would still be non-obvious over Smith, Orelup, and Genta as they fail to disclose at least one element of the instant claims.

Both independent claims 1 and 32 require that the 1,8-diaminoanthraquinones have a purity of at least 90 wt%. None of Smith, Orelup, and Genta discloses the purity of the 1,8-diaminoanthraquinones. The Examiner alleges that it would have been obvious to obtain the claimed purity of at least 90 wt% using the technique disclosed by Smith (Office Action dated 9/26/2005, page 6). Applicants respectfully submit that Smith only discloses a method of obtaining 1,5-diaminoanthraquininones by removing any remaining inorganic salts from the reaction product at the end of the reaction process (Smith, Column 4, lines 13-28). It does not discuss removing inorganic salts from 1,8-diaminoanthraquininones reaction product. More importantly, the typical impurities of the 1,8-diaminoanthraquinones of concern in the instant application are monohalogenated anthraquinones, residual amine starting materials, and 1,5-anthraquinone impurities rather than inorganic salts. (Specification at paragraphs [0038] and [0040]). Smith fails to teach techniques of removing these impurities. Additionally, Smith does not in any way teach or disclose the particular purity of at least 90 wt% of the instant claims.

As mentioned previously, the Applicants have found that the purity of the 1,8-diaminoanthraquinone derivative is important both for obtaining the appropriate light absorption characteristics for efficient UV curing (Specification at paragraphs [0012]) and for heat stability when used in thermoplastics that are typically processed at high temperatures (Specification at paragraphs [0040] and [0066]). By minimizing impurities (e.g., 1,5-anthraquinone impurities,

Specification at paragraph [0038]) present in the 1,8-diaminoanthraquinone derivative, the Applicants have discovered that the 1,8-diaminoanthraquinone derivative is more stable at high processing temperatures (see Specification at paragraph [0040]; Example 9, comparison of Composition A 1,8-bis(cyclohexylamino)anthraquinone having 99% purity and Composition B 1,5-bis(cyclohexylamino)anthraquinone, Solvent red 207).

Since none of Smith, Orelup, and Genta teaches the particular purity of 90 wt% of 1,8-diaminoanthraquinones of the instant claims, a person skilled in the art would not be motivated to use this particular purity. Accordingly, Claims 1-23, 26, 28-29, and 32-36 are not obvious over Smith, Orelup, and Genta, and are therefore allowable.

Claims 1-13, 16-26, 28-30, and 32-36 are Non-Obvious over Turner, Priester, and Genta.

Appellants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness for at least the reason that there was no suggestion to modify or combine the cited references. In addition, there was no expectation of success of combining the cited references to arrive at the instant claims.

Turner generally discloses certain 1,5- and 1,8-diaminoanthraquinones and their acid addition salts as active agents against infections of *Hymenolepis nana* in mice and *Oöchoristica symnmetrica* in mice.

Priester generally discloses a process for the manufacture of certain quaternized diaminoanthraquinones. However, no 1,8-diaminoanthraquinones are disclosed.

Appellants respectfully submit that one of ordinary skill in the art would not be motivated to combine the teachings of Turner, Priester, and Genta to arrive at the instant claims as Turner is directed to treating infections in mice, and not for dyeing polyester materials like Genta. It is basically non-analogous art. Although Priester discloses that quaternized forms of 1,4-diaminoanthraquinones can be used as cationic dyes (Priester, Column 2, lines 25-38 and Column 5, lines 55-56), it fails to teach or suggest 1,8-diaminoanthraquinone. Different diaminoanthraquinone analogs have different properties and uses. For example, paragraph [0055] of the instant application teaches that 1,8-anthraquinones and their 1,5-analogs have different absorbance ratios and the former is preferred over the later as a polymer dye. Indeed, the cited reference Priester itself also teaches that even the preparation process of the 1,4-

diaminoanthraquinone may affect its ability as a dye (Priester, Column 5, lines 56-60). Thus, general teaching of 1,4-diaminoanthraquinones as cationic dyes does not provide suggestion or motivation to use 1,8-diaminoanthraquinones for coloring the particular polymers of the instant claims. Thus, Turner, Priester, and Genta failed to provide suggestion or motivation to combine them to arrive at the instant claims.

The Examiner has stated that Turner "teaches that its material gives off color which would suggest a dye material". (Advisor Action, dated April 11, 2006, page 3). Applicants respectfully point out that this teaching is referring to the obtained 1,5-diaminoanthraquinone (Turner, page 2, lines 25-36), not to 1,8-diaminoanthraquinone. Moreover, this is merely a description of the physical property of the obtained 1,5-diaminoanthraquinone. Turner does not in any way teach the use of 1,8-diaminoanthraquinone or 1,5-diaminoanthraquinone as a colorant. Furthermore, many substances give off color, but only a small portion of colored materials can be used as dyes, especially for coloring the particular polymers of the instant claims. Since Turner is non-analogous art and does not teach the use of 1,8-diaminoanthraquinones as dyes, there is no suggestion to combine this reference with either Genta or Priester.

Additionally, there would also be no expectation of success of combining Genta, Priester, and Turner to arrive at the instant claims. As presented above, Turner does not teach the use of anthraquinones as dyes for coloring polymers, as Turner is directed to using diaminoanthraquinones for the treatment of an infection. Priester only teaches the use of 1,4-diaminoanthraquinones as cationic dyes in general, but does not teach 1,8-diaminoanthraquinones. As different diaminoanthraquinones have different properties and uses, there would be no reasonable expectation of success of using 1,8-diaminoanthraquinones for coloring the particular polymers of the instant claims that are not disclosed by Priester simply because 1,4-diaminoanthraquinones can be used as cationic dyes.

Accordingly, instant claims are not obvious over Turner, Priester, and Genta as these references fail to provide any suggestion or expectation of success to combine them to arrive at the instant Claims 1-13, 16-26, 28-30, and 32-36.

Claims 27 and 31 are Non-Obvious over Smith, Orelup, and Genta or Turner, Priester, and Genta, either of which and further in view of Adachi

Claims 27 and 31

Claims 27 and 31 both ultimately depend from independent Claim 1. For reasons discussed above, claim 1 has not been rendered obvious over Smith, Orelup, and Genta, or Turner, Priester, and Genta. Adachi generally discloses polycarbonate resin with high flowability having a viscosity average molecular weight (Mv) of 13,000 to 20,000 (Abstract). However, Adachi fails to teach or suggest dyeing polycarbonate with an anthraquinone, let alone the 1,8-diaminoanthraquinone derivative or the particular purity of this derivative of the instant Claim 1. Thus this reference does not provide the necessary teaching or suggestion that is lacking in the cited references sufficient to render Claim 1 obvious. Accordingly, Claim 1 and its dependent Claims 27 and 31 are not obvious over Smith, Orelup, and Genta, or Turner, Priester, and Genta, either of which and further in view of Adachi.

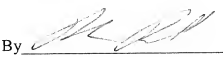
In summary, Claims 1-36 are non-obvious over the art of record. For the reasons cited above, Appellants respectfully submit that all of the claims are allowable and the application is in condition for allowance. Appellants respectfully request reversal of the outstanding rejections and allowance of this application.

In the event the Examiner has any queries regarding the submitted arguments, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention.

If there are any additional charges with respect to this Appeal Brief, please charge them to Deposit Account No. 07-0893.

Respectfully submitted,

CANTOR COLBURN LLP

By 

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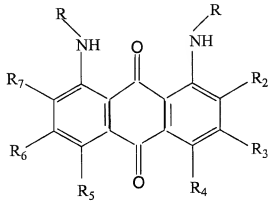
VIII. CLAIMS APPENDIX

1. (Previously Presented) A colored polymeric resin composition, comprising:

a polymeric resin, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone, polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least one of the foregoing polymeric resins; and

a 1,8-diaminoanthraquinone derivative having a purity of greater than or equal to about 90 wt% and having a Formula (VIII):



(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, $NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic

group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring.

2. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a heat stability of about 600°F (315°C), a maximum absorption located between about 530 and 610 nm, an extinction coefficient at 650 nm of less than or equal to about 1,000 $mol^{-1} \cdot cm^{-1} \cdot L$ (measured in CH_2Cl_2 solution), a minimum extinction coefficient at 600 nm greater than or equal to about 1,500 $mol^{-1} \cdot cm^{-1} \cdot L$, or combinations thereof.

3. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a light transmission of greater than or equal to about 70% at 650 nm, a curing index of greater than or equal to about 0.1 and a filtration index of greater than or equal to about 2.5, and a ratio of extinction coefficient at 650 nm to 600 nm less than about 0.1.

4. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has an absorbance ratio at 600 nm to 365 nm of greater than or equal to about 2.

5. (Original) The composition of Claim 4, wherein the absorbance ratio at 600 nm to 365 nm is greater than or equal to about 5.

6. (Original) The composition of Claim 1, wherein the absorbance ratio at 600 nm to 365 nm is greater than or equal to about 10.

7. (Original) The composition of Claim 1, wherein the polymeric resin comprises polycarbonate.

8. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative is present in an amount of about 0.01 wt% to about 5 wt%, based upon the total weight of the composition.

9. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative is present in an amount of about 0.01 wt% to about 1 wt%, based upon the total weight of the composition.

10. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a filtration index greater than or equal to about 4.0.

11. (Original) The composition of Claim 10, wherein the filtration index is greater than or equal to about 6.

12. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a curing index greater than or equal to about 0.5.

13. (Original) The composition of Claim 12, wherein the curing index is greater than or equal to about 5.

14. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative comprises 1,8 bis(cyclohexylamino)anthraquinone.

15. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative comprises 1,8-bis(cyclohexylamino)anthraquinone, 1,8-bis(isopropylamino)anthraquinone, 1,8-bis(N,N-diethylaminoethylamino)anthraquinone, or 1,8-bis(3-N,N-dimethylaminopropylamino)anthraquinone.

16. (Previously Presented) The composition of Claim 15, wherein 1,8-diaminoanthraquinone derivative is present in an amount of about 0.1 wt% to about 0.4 wt%, based upon the total weight of the composition.

17. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a ratio of extinction coefficient at 650 nm to the maximum extinction coefficient of less than or equal to about 0.1.

18. (Previously Presented) The composition of Claim 1 wherein the 1,8-diaminoanthraquinone derivative has a ratio of extinction coefficient at 650 nm to the extinction coefficient at 600 nm of less than or equal to about 0.1.

19. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative has a maximum absorption located between about 540 nm and about 600 nm as measured in methylene chloride solution.

20. (Original) The composition of Claim 19, wherein the maximum absorption is located between about 550 nm and about 590 nm as measured in methylene chloride solution.

21. (Previously Presented) The composition of Claim 1, wherein the 1,8-diaminoanthraquinone derivative gives a hue angle value of less than 335 degrees in polycarbonate composition (when used at a loading of 0.01 pph at a part thickness of 3.2 mm).

22. (Original) The composition of Claim 21, wherein the hue angle is less than or equal to about 330 degrees.

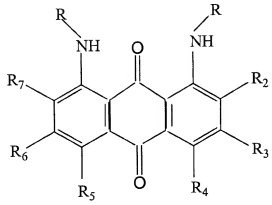
23. (Original) The composition of Claim 22, wherein the hue angle of less than or equal to about 320 degrees.

24. (Previously Presented) A colored polymeric resin composition, comprising:

a polymeric resin, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone, polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer,

polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least one of the foregoing polymeric resins; and

a 1,8-diaminoanthraquinone derivative having a Formula (VIII):



(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, --$NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring;

wherein an article formed from the composition has a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm).

25. (Original) The composition of Claim 24, wherein the hue angle is less than or equal to about 320 degrees.

26. (Previously Presented) The composition of Claim 21, wherein said polymeric resin is a polycarbonate resin.

27. (Original) The composition of Claim 26 wherein the polycarbonate resin has a weight average molecular weight (Mw) of less than or equal to about 20,000.

28. (Original) An article formed from the composition of Claim 1.

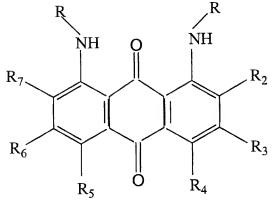
29. (Original) An article formed from the composition of Claim 21.

30. (Original) An article formed from the composition of Claim 24.

31. (Original) An article formed from the composition of Claim 27.

32. (Previously Presented) A method of making a colored polymeric article, comprising:

forming a composition of a polymeric resin and a 1,8-diaminoanthraquinone derivative, wherein the polymeric resin is polyvinyl chloride, polyolefin, polyamide, polysulfone , polyimide, polyether imide, polyether sulfone, polyphenylene sulfide, polyether ketone, polyether ether ketone, ABS resin, polystyrene, polybutadiene, polyacrylate, polyacrylonitrile, polyacetal, polycarbonate, polyphenylene ether, ethylene-vinyl acetate copolymer, polyvinyl acetate, liquid crystal polymer, ethylene-tetrafluoroethylene copolymer, polyvinyl fluoride, polyvinylidene fluoride, polyvinylidene chloride, polytetrafluoroethylene, or combinations comprising at least one of the foregoing polymeric resins, and wherein the 1,8-diaminoanthraquinone derivative has a purity of greater than or equal to about 90 wt%, and has a Formula (VIII):



(VIII)

wherein R_2 - R_7 are, individually, selected from the group consisting of a hydrogen atom, an aliphatic group, an aromatic group, a heterocyclic group, a halogen atom, a cyano group, a nitro group, --COR_9, --$COOR_9$, --$NR_{10}COR_{11}$, --$NR_{10}SO_2R_{11}$, --$CONR_9R_{10}$, --$CONHSO_2R_{11}$, and --SO_2NHCOR_{11}; in which R_9 and R_{10} are, individually, selected from the group consisting of a

hydrogen atom, an aliphatic group, an aromatic group, and a heterocyclic group; wherein R_{11} is selected from the group consisting of an aliphatic group, an aromatic group, and a heterocyclic group; and wherein R is selected from the group consisting of cyclohexyl, isopropyl, 3-N,N-dimethylaminopropyl, N,N-diethylaminoethyl, an allyl group containing 3 to 20 carbon atoms, a hydroxyl group, a 5-membered heterocyclic ring, and a 6-membered heterocyclic ring;

wherein the 1,8-anthraquinone derivative gives a hue angle value of less than or equal to about 330 degrees (when used at a loading of 0.01 pph at an article thickness of 3.2 mm); and

forming the composition into the article.

33. (Previously Presented) The method of Claim 32, wherein the 1,8-diaminoanthraquinone derivative is present in an amount of less than or equal to about 80 wt% based upon the total weight of the composition.

34. (Original) The method of Claim 32, further comprising forming the composition insitu during the forming of the article.

35. (Previously Presented) The method of Claim 34, wherein the forming of the composition insitu further comprises using at least one of a masterbatch, single colorant dispersion, or a liquid dying process.

36. (Previously Presented) The method of Claim 32, wherein the polymeric resin is formed into colored pellets prior to being introduced to a mold.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDING APPENDIX

None.